

REMARKS

This amendment is submitted in response to the Office Action dated April 22, 2003. A petition for a two month extension of time is enclosed herewith to bring the date of response to September 22, 2003. Claims 14, and 49 are presently amended to more clearly point out and distinctively claim the invention. Claim 14 is amended to recite a specific propellant consisting essentially of a mixture of one or more paraffin waxes and carbon black in a certain concentration range. Claim 49 is amended to further recite the propellant composition. Claim 19 is presently canceled. Claims 15 to 18 and 21 were previously cancelled.

Claim Objections

The Examiner objects to claims 14 and 19 due to an informality in the claims, where some words were contained in brackets. Claim 19 has been cancelled and this informality has been deleted in claim 14.

35 U.S.C. 112 Rejections

The Examiner rejects claims 14, 19 and 49 under 35 U.S.C. 112, second paragraph as being indefinite. Applicant respectfully traverses this rejection and submits that the amended claims are definite.

Applicant has deleted the equation in claim 14 which Applicant believes will address the Examiner's 112 rejections. Claim 19 has been canceled. Claim 49 has been amended to further define the propellant composition. Applicant respectfully submits that the amended claims clearly set forth the metes and bounds of the invention.

The Examiner rejects claims 14, 19 and 49 under 35 U.S.C. 112, first paragraph as containing subject matter not enabled. Applicant respectfully traverse this rejection and submits that the claims are enabled by the specification.

Claim 14 as amended recites a specific propellant composition which is clearly enabled by the specification. Claim 19 has been canceled.

Claim 49 as amended recites a propellant comprised of a mixture of one or more paraffin waxes having a mean carbon number in the range of 15 to 80, which under heat transfer from the oxidant forms a liquid layer having a liquid viscosity of less than about 1 milliPa-sec and a surface tension of less than about 25 milliN/m. Applicant respectfully submits that amended claim 49 contains subject matter described in the specification in such a way as to enable one skilled in the art to practice the invention.

Claim 49 requires that the propellant be comprised of one or more paraffin waxes having a specific mean carbon number *and* that the propellant have specific liquid viscosity and surface tension values. One skilled in the art can make these measurements without undue experimentation. Moreover, the fact that experimentation may be complex does not necessarily make it undue particularly if a person skilled in the art typically engages in such experimentation. *In re Angstadt*, 190 USPQ 216 (C.C.P.A 1976).

The breath of the claimed invention is not unlimited as the Examiner suggests. Claim 49 is limited by a range of paraffin waxes with specific viscosity and surface tension values. Thus, it is propellants of paraffin wax that satisfy the recited range carbon number and which form a liquid layer upon combustion with the recited viscosity and surface tension values that will satisfy claim 49. The propellant compositions as amended are reasonably ascertainable without undue experimentation, and there are *not* an infinite number of combinations and permutations of ingredients possible.

35 U.S.C. 102(b) and 103(a) Rejections

The Examiner rejects Claims 14 and 49 under 35 U.S.C. 102(b) as anticipated by or, in the alternative under 35 U.S.C. 103 as obvious over each of Strickler, Anderson and Goode et al. Applicant respectfully traverse the rejections and submits that none of the cited prior art references teach, or reasonably suggest, the claimed invention.

Strickler teaches a heterogeneous fuel composition having a continuous phase and a dispersed phase distributed therein. The dispersed phase roughens the surface and enhances heat transfer thereby increasing the burn rate of the fuel. Strickler roughens the surface by various means including putting solid particles in the dispersed phase, having voids or bubbles in the dispersed phase, or by encapsulating liquid in a carrier or using an immiscible liquid that is sheared into droplets. Strickler does not teach or reasonably suggest a propellant of one or more paraffin waxes and carbon black at a concentration in the range of 0.2 to 2.0 weight percent, as recited in Applicant's amended claims. Strickler does not teach or reasonably suggest a propellant of one or more paraffin waxes having a mean carbon number in the range of 15 to 80 and the specific liquid viscosity and surface tension values as recited in Applicant's amended claims.

Anderson teaches the use of polynorborene as a binder for liquid and solid materials having a heat of combustion above about 9300 Kcal/cc to form a combustible composition. Anderson does not teach or reasonably suggest a propellant of one or more paraffin waxes with specific properties and/or in combination with carbon black at a specific concentration as recited in Applicant's claims.

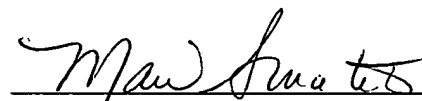
Good et al. teaches a fuel grain with an open-celled matrix structure and a fuel such as lithium, loaded in the open cell. The matrix structure has a melting temperature greater than the boiling temperature of the fuel. Good does not teach or suggest a propellant of paraffin waxes with specific properties and/or in combination with carbon black at a specific concentration as recited by Applicant's claims.

The composition recited in Applicant's amended claims is not taught or reasonably suggested in the prior art, and Applicant respectfully submits that the prior art does not inherently possess the features of the claimed invention. Further, as shown earlier in the record, the propellant recited in Applicant's present claims provided unexpected results. Applicant has made of record in the Interview Summary dated August 24, 2002, still photos from a video demonstration showing test firing sequences using the propellant of the present invention. As shown therein, the propellant of the present invention showed remarkably increased regression rates when compared to conventional propellants. Such results were unexpected and not obvious.

Applicant respectfully submits that after reading Strickler, Anderson and Goode, either alone or in combination, one would not be motivated to arrive at Applicant's claimed invention.

Based on the foregoing, Applicant respectfully submits that the application is now in condition for allowance. If any matters can be resolved by telephone, the Examiner is invited to call the undersigned attorney at the telephone number listed below. The Commissioner is authorized to charge any additional fees to Deposit Account No. 50-2319 (Order No. A-67587-1/AJT/MSS).

Respectfully submitted,



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